6. (Amended) The method of claim 1 or 5, wherein said second component comprises at least one of silicon fluoride, phosphorous fluoride, and sulfur fluoride.

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13. (Amended) The method of claim 1, further comprising sustaining the plasma by a first electromagnetic field and a second electromagnetic field, the first electromagnetic field having a frequency of about 13 megahertz, the second electromagnetic field having a frequency of about 2 magahertz.

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16. (Amended) The method of claim 2, further comprising controlling the rate of etching at the peripheral portion to be within about 1% of the rate of etching at the central portion, the peripheral portion being at least about 50 mm from the central portion.

17. (Amended) The method of claim 1, wherein the first component is carbon tetrafluoride, the second component is sulfur hexafluoride, the volume ratio of (first component):(second component) is about 40:1, and the method further comprising sustaining the plasma by using a first electromagnetic field and a second electromagnetic field, the first electromagnetic field having a frequency of about 13 megahertz and the second electromagnetic field having a frequency of about 2 megahertz.

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18. (Amended) A method, comprising:

providing a substrate material comprising a quartz plate,

providing a gas for generating a plasma, the gas including a first component comprising molecules C_xF_y, x and y being integers, and a second component comprising at least one of silicon fluoride, phosphorous fluoride, and sulfur fluoride;

generating the plasma; and

etching the substrate material.

21. (Amended) A method, comprising:

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providing a gas for generating a plasma in a chamber, the gas including a first component and a second component, wherein the first component produces a positive plasma and the second component produces a negative plasma, the positive plasma having more electrons than negative ions, the negative plasma having more negative ions than electrons;

generating the plasma; and

controlling the ion distribution within the chamber by selecting the amount of the first component and the second component.

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22. (Amended) The method of claim 21 wherein the first component comprises molecules C_xF_y, x and y being integers, and the second component comprises at least one of sulfur fluoride, silicon fluoride, and phosphorus fluoride.

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24. (Amended) An apparatus comprising:

a chamber;

a support located within the chamber;

a quartz plate supported by the support;

a high frequency energy source;

a first gas supply providing a first gas, the first etchant gas comprising C_xF_y molecules, x and y being integers;

a first inlet for introducing the first gas into the chamber to form a first plasma gas when energized by the high frequency energy source;

a second gas supply providing a second gas, the second etchant gas comprising S_pF_q molecules, p and q being integers; and

a second inlet for introducing the second gas into the chamber to form a second plasma gas when energized by the high frequency energy source;

wherein the first and second plasma gas are used to etch the quartz plate.

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26. (Amended) The apparatus of claim 24, wherein the first gas is carbon fluoride and the second gas is sulfur fluoride. --

Please add claims 27-40, as follows:

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-- 27. (New) The method of claim 18, further comprising adjusting a ratio of the first component to the second component such that the plasma etches the substrate material at a substantially uniform rate across a substantial portion of the substrate material.

28. (New) The method of claim 21, wherein controlling the ion distribution comprises controlling the distribution of a first group of positive ions generated from the first component such that the density of the first group of positive ions decreases radially from a central region of the chamber towards a peripheral region of the chamber.

29. (New) The method of claim 28, wherein controlling the ion distribution comprises controlling the distribution of a second group of positive ions generated from the second component such that the density of the second group of positive ions increases radially from a central region of the chamber towards a peripheral region of the chamber.

30. (New) The method of claim 29, further comprising providing a substrate in the chamber and controlling the distribution of first and second groups of positive ions such that the density of the sum of the first and second groups of positive ions is substantially uniform across a substantial portion of the substrate.

31. (New) A method, comprising:

providing a dielectric substrate, portions of the substrate being covered by a resist;

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providing a gas to generate a plasma, the gas including a first component and a second component selected such that varying the ratio of the first component to the second component varies the rate of etching of one location of the substrate relative to another location on the substrate, the first and second components selected such that the plasma etches the dielectric substrate at a rate that is faster than a rate that the plasma etches the resist;

generating the plasma;

using the plasma to etch portions of the dielectric substrate not covered by the resist; and

supplying the gas with the first and second components at a ratio such that the plasma etches portions of the substrate not covered by the resist at a substantially uniform rate across a substantial portion of the substrate.

32. (New) The method of claim 31, wherein the dielectric substrate comprises quartz.

33. (New) A method, comprising:

providing a substrate in a chamber;

providing a first gas including carbon fluoride $C_{x1}F_{y1}$, x1 and y1 being integers;

providing a second gas including molecules comprising at least one of sulfur fluoride $S_{x2}F_{y2}$, phosphorous fluoride $P_{x3}F_{y3}$, and silicon fluoride $Si_{x4}F_{y4}$, x2, x3, x4, y2, y3, and y4 being integers;

supplying an electromagnetic field at a predetermined power level to energize the first and second gases into a plasma; and

adjusting a ratio of the first gas to the second gas so that the plasma etches the substrate material at a substantially uniform rate across a substantial portion of the substrate.

34. (New) The method of claim 33, further comprising adjusting a pressure of a chamber enclosing the substrate and the plasma to a predetermined pressure level.

35. (New) A method, comprising:

providing a substrate in a chamber;

providing a first gas selected so that when the first gas is energized by an electromagnetic field having a predetermined power and under a predetermined chamber pressure, the first gas is energized into a plasma having more negative ions than electrons;

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providing a second gas selected so that when the second gas is energized by an electromagnetic field having the predetermined power level and under the predetermined chamber pressure level, the second gas is energized into a plasma having more electrons than negative ions;

applying an electromagnetic field to the first and second gases to generate a plasma; and

adjusting the amount of the first gas and the second gas in the chamber so that the density of positive ions generated from the first and second gases near the surface of the substrate is substantially uniform across a substantial portion of the substrate.

36. (New) The method of claim 35, further comprising using the plasma to etch the substrate.

37. (New) The method of claim 35, wherein the first gas is also selected so that when the first gas is energized into a plasma by an electromagnetic field having the predetermined power

and under the predetermined chamber pressure, positive ions generated from the first gas has a density distribution that increases radially from a central region of the substrate surface towards a peripheral region of the substrate surface.

38. (New) The method of claim 37, wherein the second gas is also selected so that when the second gas is energized into a plasma by an electromagnetic field having the predetermined power and under the predetermined chamber pressure, positive ions generated from the second gas has a density distribution that decreases radially from a central region of the substrate surface towards a peripheral region of the substrate surface.

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39. (New) The method of claim 35, wherein the volume ratio of the first gas to the second gas is between 1:10 to 1:100.

40. (New) The method of claim 35, wherein which the substrate comprises quartz. --